IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Yamanaka et al. Examiner: Kruer, K.

Serial No.: 08/855,905 Group: Art Unit 1773

Filed: May 14, 1997 Docket: 443-17

For: SYNTHETIC PAPER MADE OF STRETCHED POLYPROPYLENE FILM Date: October 30, 2001

Assistant Commissioner for Patents
Washington, D.C. 20231

AMENDMENT TRANSMITTAL FORM

Sir:

Transmitted herewith is an amendment in the above-identified application.

[ ] Small entity status of this application under 37 C.F.R. § 1.9 and 1.27 has been established by a verified statement previously submitted.

[ ] A verified statement to establish small entity under 37 C.F.R. § 1.9 and 1.27 is enclosed.

[x] No additional fee is required.

The fee has been calculated as shown below:

	(Col. 1)		(Col. 2)	(Col. 3)	SMALL ENTITY			OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDIT. FEE	OR	RATE	ADDIT. FEE
TOTAL	21*	MINUS	21**	=0	X 9	$		X 18	$ 0
INDEP.	2*	MINUS	3	=0	X 42	$		X 84	$
☐ FIRST PRESENTATION OF MULTIPLE DEP. CLAIM					X 140	$		X 280	$
					TOTAL	$		OR TOTAL	$
				ADDIT. FEE		$			

* If the entry in Co. 1 is less than entry in Col. 2, write "0" in Col. 3.
** If the "Highest No. Previously Paid for" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The Highest No. Previously Paid For" (Total or indep.) is the highest number found in the appropriate box in Col. 1 of a prior amendment or the number of claims originally filed.

CERTIFICATE OF MAILING 37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope, addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231 on October 30, 2001.

Date: October 30, 2001

George M. Kaplan

[ ] Please charge Deposit Account No. 04-1121 in the amount of $ 0.00 . Two (2) copies of this sheet are enclosed.

[ ] A check in the amount of $ _____ is enclosed.

[X] Please charge any deficiency as well as any other fee(s) which may become due under 37 C.F.R. § 1.16 and/or 1.17 at any time during the pendency of this application, or credit any overpayment of such fee(s) to Deposit Account No. 04-1121. Also, in the event any extensions of time for responding are required for the pending application(s), please treat this paper as a petition to extend the time as required and charge Deposit Account No. 04-1121 therefor. **TWO (2) COPIES OF THIS SHEET ARE ENCLOSED.**

Respectfully submitted,

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RESPONSE

Sir:

Please enter the following Response to the Office Action mailed April 30, 2001 by the Patent and Trademark Office in the above-identified application

The claims in the application remain 1-20 and 27.

Favorable reconsideration of the application is respectfully requested.

All claims have been rejected as obvious over U.S. Pat. No. 4,318,950 to Takashi et al. in view of U.S. Pat. No. 5,233,924 to Ohba et al. and European Patent No. 613,919 to Ueda et al. in paragraph 2 of the Office Action. However, it is respectfully submitted that all claims pending herein are patentable over the applied art for the following reasons.

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

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George M. Kaplan

The object of the present invention is to provide a synthetic paper having excellent permanent antistatic properties and excellent offset printability. The synthetic paper of the invention has a surface layer which contains a polymeric antistatic agent and has improved antistatic properties imparted thereto through stretching. The resin film of the invention further contains fine inorganic particles and has been opacified by stretching and resultant void generation.

Due to the use of polymeric permanent antistatic agent, troubles arising from the use of conventional low molecular weight antistatic agents are prevented. Such troubles include: film sticking to the film-forming rolls and roll fouling, each caused during film formation by anti-static agent bleeding; blocking attributable to surface tackiness after film formation; and ink adhesion failures during printing. Furthermore, the synthetic paper of the invention does not change in offset printability during long-term storage (as a stock) or with changes in ambient conditions (especially humidity changes).

Takashi et al. disclose an invention relating to a synthetic paper comprising propylene containing fine inorganic particles and a process for producing the same. However, the antistatic agents described therein are low-molecular weight anti-static agents. The anti-static agents shown in the examples of Takashi et al. are mere surfactants. The polymeric antistatic agent used in the present invention is not disclosed therein, there being no description in Takashi et al. which suggests the same.

With respect to the amount of an antistatic agent to be used, Takashi et al. teachs at column 19, lines 21-22, that the amount of the antistatic agent is about from 0.1 to 1.5% by weight. In contrast, in the present invention, the polymeric antistatic agent is used in an amount as large as from 10 to 250 parts by weight per 100 parts by weight of the resin components. The synthetic paper disclosed in Takashi et al. is hence totally different from the present invention.

Ohba et al. disclose an invention relating to a synthetic paper comprising a polyolefin containing fine inorganic particles. There is description therein to the effect that the synthetic paper has an opacity of 80% or higher and excellent suitability for writing with a pencil. However, the object of Ohba et al. is to provide a polyolefin-based synthetic paper which does not curl upon infiltration of a printing ink solvent.

Specifically, the synthetic paper is one which is excellently suitable for writing with a pencil and in printability and which comprises a stretched polyolefin film layer containing from 8 to 65% by weight fine inorganic particles, a stretched ethylene/vinyl alcohol copolymer film layer laminated to at least one side of the polyolefin film layer , and a coating layer formed on the outer side of at least one of the stretched ethylene/vinyl alcohol copolymer films.

The invention by Ohba et al. differs in layer constitution from the present invention. There is no description therein concerning improvement in suitability for paper feeding/discharge, a low surface resistivity, incorporation of a polymeric antistatic agent,

or the like, which are subjects for offset printing to be accomplished by the present invention.

Ueda et al. disclose an invention relating to a resin composition containing a polymeric antistatic agent (polyetheresteramide); injection molded articles (solid articles) having improved antistatic properties are disclosed in the examples. An examination of the examples of Ueda et al. reveals the following.

First, all the moldings disclosed are injection molded articles. There is no description therein concerning the technique according to the present invention in which a sheet formed by extrusion is further stretched to obtain a film. Secondly, the injection molded articles obtained by the invention by Ueda et al. contain no filler and do not have voids therein. Consequently, the molded articles obtained are transparent or translucent.

Although there is description in Ueda et al. to the effect that a filler as an example of resin additives may be added to the composition, no specific examples of filler kind are disclosed therein. Ueda et al. further teach that a preferred resin additive is a surfactant and the amount of the surfactant is from 0.01 to 5% by weight, preferably from 0.05 to 3% by weight based on the sum of the polyetheresteramide and an alkali metal (page 11, lines 19-24). In contrast, in the claimed synthetic paper of the present invention, the amount of the filler is from 10 to 250 parts by weight per 100 parts by weight of the resin components. (The amount thereof in the examples are from 11 to 233.7 parts by weight (in the surface layer); the fine inorganic particles incorporated serve to generate a

large amount of voids in the surface layer upon stretching and thereby impart opaqueness and suitability for writing with a pencil (see the specification, page 19, lines 14-19).)

The Examiner refers at page 4 of the Office Action to the teaching in Ueda et al. that the incorporation of a polyamide increases the surface orientation of a polyetheresteramide (col. 5, lines 38-4). This phenomenon is totally different from the effect of stretching in the present invention which accomplishes improvement in anti-static property. The reasons for this are as follows.

Ueda et al. teach that especially in the case where a crystalline polyolefin is used as a matrix (a polyetheresteramide shows poor surface orientation therein) and a polyamide is incorporated thereinto, the polyamide during cooling crystallizes sooner than the crystalline polyolefin matrix because the polyamide has a higher melting point than the crystalline polyolefin. Since the polyestheramide is well compatible with the polyamide, it becomes present in a higher concentration around the polyamide which is crystallizing. Furthermore, since the moldings of the invention by Ueda et al. are solid articles (several millimeters) such as injection molded articles and are thicker that the stretched extrudate films according to the present invention (several tens to hundreds of micrometers), crystallization begins from the surface which cools rapidly. As a result, the surface of the molding becomes rich in the polyetheresteramide. Namely the polyamide incorporated in the polyolefin matrix undergoes surface orientation.

In contrast, a feature of the present invention is by stretching an extrudate sheet, the polyetheresteramide is oriented in the film surface to provide an improved surface resistivity. This mechanism is completely different from in the injection-molded articles of Ueda et al.

In the case of extrudate sheets, the surface resistivity varies considerably depending upon stretching. This phenomenon was demonstrated in the Comparative Examples 2 and 3 given in the specification of the present application using a composition (containing no fine inorganic particles) corresponding to injection-molded articles of Ueda et al. By stretching, the surface resistivity was improved 1,000 times. In the extrudate sheets which have undergone no stretching, the polyetheresteramide is present therein in a merely dispersed state and the surface resistivity thereof is poor as shown in Comparative Example 3. Incidentally, it is difficult to stretch the injection-molded articles of Ueda et al. while synthetic paper (stretched film), such as of the present invention, cannot be produced from the injection molded articles.

It is totally unexpected from the invention in Ueda et al. that the stretched extrudate film of the present invention which has improved antistatic properties, could be produced.

To summarize, it is not obvious to combine Takashi et al. in which there is no description concerning (1) incorporation of a polymeric antistatic agent, (2) improvement in suitability for paper feeding/discharge in offset printing, etc., with Ohba et al., which

employ (3)a different layer constitution and in which there is no description concerning (4) improvement in suitability for paper feeding/discharge in offset printing, (5) a low surface resistivity, (6) incorporation of a polymeric antistatic agent, etc. and with Ueda et al., which is (7) an invention relating to a polyetheresteramide composition, (8) has different components (there is no description concerning the incorporation of specific fine inorganic particles), and in which there is no description concerning the (9) extrusion molding and film stretching.

With respect to the Declarations submitted during prosecution of the present application, the first Declaration submitted with the response of October 20, 1999 provides the following comparison with Takashi et al.: US Pat. No. 4,318,950 relates to a synthetic paper obtained by laminating a uniaxially stretched thermoplastic resin film containing an inorganic filler to each side of a biaxially stretched base layer of a thermoplastic resin, and to a process for producing the same. The specification contains a description to the effect that a low molecular weight antistatic agent is incorporated in the paper-like (surface) layers and base layer. However, the amounts of the antistatic agent incorporated are as small as from 0.1 to 1.0 part by weight as shown in Tables 1 and 2 of this reference. In contrast, in the present invention an antistatic agent is contained in an amount as large as from 10 to 45% by weight based on the resin components.

In this first Declaration, the invention by Takashi et al. in which a low molecular weight antistatic agent is incorporated, is followed up to evaluate the surface

resistivity before and after water washing and offset printability. The results show that the synthetic paper containing a low molecular weight antistatic agent in a small amount as in the invention by Takashi et al. (0.3 parts; the same amount as in Experiment Example 2 of the reference) was improved only slightly in antistatic property and had poor suitability for paper feeding/discharge in offset printing. On the other hand, when the low-molecular weight antistatic agent was incorporated in a large amount as in the present invention (16.7 parts by weight based on the resin components, as in Example 1 of the present invention), then the rolls during film formation became tacky and film formation was hence difficult. Through water washing, the surface resistivity of the film obtained deteriorated considerably from 10^{11} to 10^{15} because the antistatic agent present in the film surfaces dissolved away. Thus, antistatic properties were lost. The results further show that this film had poor suitability for paper feeding/discharge in offset printing.

The meaning of the evaluation of surface resistivity before and after water washing and offset printability (ink adhesion and suitability for paper feeding/discharge) is further explained. Synthetic papers produced by stretching a composition comprising a polyolefin containing fine inorganic particles are used as various commercial products after having been printed on a surface thereof by offset printing. However, not all of such synthetic papers are subjected to printing immediately after production; there are often cases where synthetic papers produced are stored in printing companies for as long as a one half year to one year before being used as commercial products. Consequently, if a

synthetic paper's surface state changes causing a trouble in printing during storage as stock, the paper has no commercial value. In general, synthetic papers are exposed to changes in ambient conditions, i.e., temperature changes and humidity changes during storage as a stock. The water washing show in the present invention provides an accelerated test with respect to humidity changes to which synthetic papers are exposed during storage. The results of the evaluations of surface resistivity before and after water washing and of offset printability (ink adhesion and suitability for paper feeding/discharge) after water washing show that the synthetic papers containing the (low-molecular weight) antistatic agent used in Takashi et al. deteriorated in offset printability during storage and lost their commercial value.

One of the reasons for deterioration of antistatic properties during storage is the (low molecular weight) antistatic agent used in Takashi et al., which has poor compatibility with the polyolefin matrix, moves with time after synthetic paper production (it is apt to move because of its low molecular weight) and bleeds out. The (low molecular weight) antistatic agent which has migrated to the film surface is shed off mechanically or dissolved away by moisture in air. As a result, the antistatic properties deteriorate and the commercial value is lost.

The second Declaration enclosed with the Supplemental Response of April 5, 2001 shows follow-up experiments which were conducted based on the Examiner's opinion (expressed in the interview held in August 2000) that in the order for the

Comparative Examples 2 and 3 of the present specification to comparatively show the effect of stretching, they should be conducted with respect to films which have undergone the same surface treatment. The experiments demonstrate that the antistatic properties of the polymeric antistatic agent incorporated are greatly improved by stretching; this improvement is a point of the invention.

The reason why films containing no fine inorganic particles have been evaluated in Comparative Examples 2 and 3 is that these comparative examples show the effect of stretching in comparison with the invention of Ueda et al. (containing no fine inorganic particles) under such conditions that the effect of fine inorganic particles were excluded.

In this Supplemental Declaration, experiments were conducted as modifications of the Comparative Examples 2 and 3 given in the present specification with respect to the surface (corona) treatment. Specifically, Experiment 1 is the same as Comparative Example 2 except that the corona treatment was additionally performed, while Experiment 2 is the same as the Comparative Example 3 except that the corona treatment was omitted. The surface resistivity and the suitability for paper feeding/discharge in Experiments 1 and 2 were the same as in the Comparative Examples 2 and 3 of the specification respectively. However, the ink adhesion in Experiment 1 was "Δ", slightly better than"X" in the Comparative Example 2, due to the corona treatment. The ink

adhesion in Experiment 2 was "X" poorer than "Δ" in the Comparative Example 3, because the film had not undergone corona treatment.

These results document that the surface resistivity and suitability for paper feeding/discharge remained unchanged irrespective of whether the film had undergone a corona treatment or not, and that the extrudate sheets obtained from the composition disclosed by Ueda et al. had insufficient antistatic properties. Namely, it has been demonstrated that stretching is essential for the effective development of antistatic properties.

Accordingly, in view of the forgoing remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any questions, then it is respectfully requested that the undersigned attorney be contacted at the earliest convenience to discuss the present application. A petition for an automatic three month extension of time for response is enclosed in triplicate together with the requisite petition fee.

Early, favorable action is earnestly solicited.

Respectfully submitted,
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